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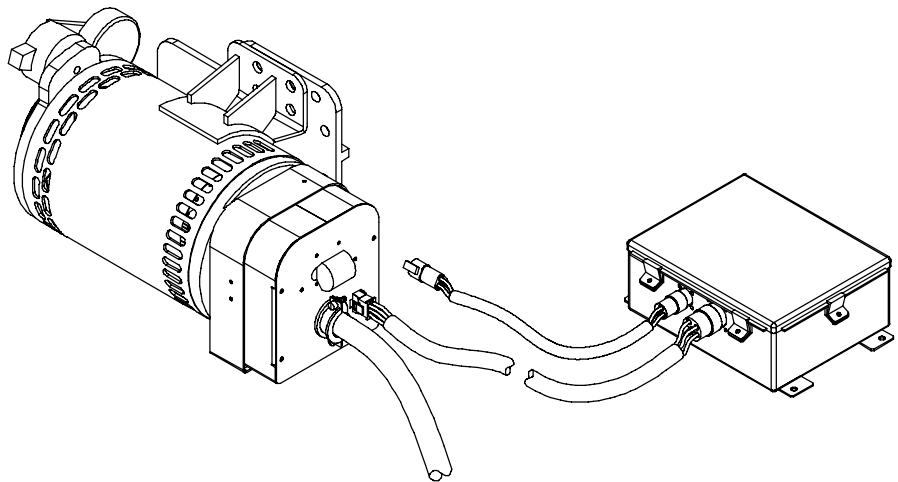
2006-07

Description



Belt/Hydraulic-Driven Generator For  
Welding Power Sources

# Belt-Drive Generator Hydraulic-Drive Generator



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## OWNER'S MANUAL

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# SECTION 1 – SAFETY PRECAUTIONS – READ BEFORE USING

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▲ **Warning: Protect yourself and others from injury — read and follow these precautions.**

## 1-1. Symbol Usage



Means Warning! Watch Out! There are possible hazards with this procedure! The possible hazards are shown in the adjoining symbols.

▲ **Marks a special safety message.**

☞ Means "Note"; not safety related.



This group of symbols means Warning! Watch Out! possible ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the hazards.

## 1-2. Arc Welding Hazards

▲ **The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the Safety Standards listed in Section 1-7. Read and follow all Safety Standards.**

▲ **Only qualified persons should install, operate, maintain, and repair this unit.**

▲ **During operation, keep everybody, especially children, away.**



### ELECTRIC SHOCK can kill.

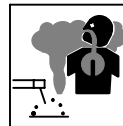
Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

- Do not touch live electrical parts.
- Wear dry, hole-free insulating gloves and body protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- Do not use AC output in damp areas, if movement is confined, or if there is a danger of falling.
- Use AC output ONLY if required for the welding process.
- If AC output is required, use remote output control if present on unit.
- Additional safety precautions are required when any of the following electrically hazardous conditions are present: in damp locations or while wearing wet clothing; on metal structures such as floors, gratings, or scaffolds; when in cramped positions such as sitting, kneeling, or lying; or when there is a high risk of unavoidable or accidental contact with the workpiece or ground. For these conditions, use the following equipment in order presented: 1) a semiautomatic DC constant voltage (wire) welder, 2) a DC manual (stick) welder, or 3) an AC welder with reduced open-circuit voltage. In most situations, use of a DC, constant voltage wire welder is recommended. And, do not work alone!
- Disconnect input power or stop engine before installing or servicing this equipment. Lockout/tagout input power according to OSHA 29 CFR 1910.147 (see Safety Standards).
- Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
- Always verify the supply ground — check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet.
- When making input connections, attach proper grounding conductor first — double-check connections.
- Frequently inspect input power cord for damage or bare wiring — replace cord immediately if damaged — bare wiring can kill.
- Turn off all equipment when not in use.
- Do not use worn, damaged, undersized, or poorly spliced cables.
- Do not drape cables over your body.
- If earth grounding of the workpiece is required, ground it directly with a separate cable.
- Do not touch electrode if you are in contact with the work, ground, or another electrode from a different machine.

- Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.
- Clamp work cable with good metal-to-metal contact to workpiece or worktable as near the weld as practical.
- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.
- Do not connect more than one electrode or work cable to any single weld output terminal.

### SIGNIFICANT DC VOLTAGE exists in inverters after stopping engine.

- Stop engine on inverter and discharge input capacitors according to instructions in Maintenance Section before touching any parts.



### FUMES AND GASES can be hazardous.

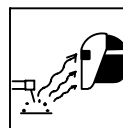
Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

- Keep your head out of the fumes. Do not breathe the fumes.
- If inside, ventilate the area and/or use exhaust at the arc to remove welding fumes and gases.
- If ventilation is poor, use an approved air-supplied respirator.
- Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instructions for metals, consumables, coatings, cleaners, and degreasers.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Always have a trained watchperson nearby. Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.



### BUILDUP OF GAS can injure or kill.

- Shut off shielding gas supply when not in use.
- Always ventilate confined spaces or use approved air-supplied respirator.



### ARC RAYS can burn eyes and skin.

Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly off from the weld.

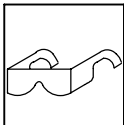
- Wear a welding helmet fitted with a proper shade of filter to protect your face and eyes from arc rays and sparks when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards).
- Wear approved safety glasses with side shields under your helmet.
- Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.
- Wear protective clothing made from durable, flame-resistant material (wool and leather) and foot protection.



### WELDING can cause fire or explosion.

Welding on closed containers, such as tanks, drums, or pipes, can cause them to blow up. Sparks can fly off from the welding arc. The flying sparks, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode to metal objects can cause sparks, explosion, overheating, or fire. Check and be sure the area is safe before doing any welding.

- Protect yourself and others from flying sparks and hot metal.
- Do not weld where flying sparks can strike flammable material.
- Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
- Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
- Do not weld on closed containers such as tanks, drums, or pipes, unless they are properly prepared according to AWS F4.1 (see Safety Standards).
- Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock and fire hazards.
- Do not use welder to thaw frozen pipes.
- Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
- Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.
- Follow requirements in OSHA 1910.252 (a) (2) (iv) and NFPA 51B for hot work and have a fire watcher and extinguisher nearby.



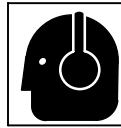
### FLYING METAL can injure eyes.

- Welding, chipping, wire brushing, and grinding cause sparks and flying metal. As welds cool, they can throw off slag.
- Wear approved safety glasses with side shields even under your welding helmet.



### HOT PARTS can cause severe burns.

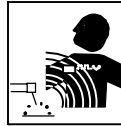
- Allow cooling period before maintaining.
- Wear protective gloves and clothing when working on a hot engine.
- Do not touch hot engine parts or just-welded parts bare-handed.



### NOISE can damage hearing.

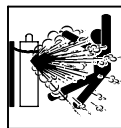
Noise from some processes or equipment can damage hearing.

- Wear approved ear protection if noise level is high.



### MAGNETIC FIELDS can affect pacemakers.

- Pacemaker wearers keep away.
- Wearers should consult their doctor before going near arc welding, gouging, or spot welding operations.



### CYLINDERS can explode if damaged.

Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

- Protect compressed gas cylinders from excessive heat, mechanical shocks, slag, open flames, sparks, and arcs.
- Install cylinders in an upright position by securing to a stationary support or cylinder rack to prevent falling or tipping.
- Keep cylinders away from any welding or other electrical circuits.
- Never drape a welding torch over a gas cylinder.
- Never allow a welding electrode to touch any cylinder.
- Never weld on a pressurized cylinder — explosion will result.
- Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
- Turn face away from valve outlet when opening cylinder valve.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.

## 1-3. Engine Hazards



### BATTERY EXPLOSION can BLIND.

- Always wear a face shield, rubber gloves, and protective clothing when working on a battery.
- Stop engine before disconnecting or connecting battery cables or servicing battery.
- Do not allow tools to cause sparks when working on a battery.
- Do not use welder to charge batteries or jump start vehicles.
- Observe correct polarity (+ and -) on batteries.
- Disconnect negative (-) cable first and connect it last.



### FUEL can cause fire or explosion.

- Stop engine and let it cool off before checking or adding fuel.
- Do not add fuel while smoking or if unit is near any sparks or open flames.
- Do not overfill tank — allow room for fuel to expand.
- Do not spill fuel. If fuel is spilled, clean up before starting engine.
- Dispose of rags in a fireproof container.
- Always keep nozzle in contact with tank when fueling.



### MOVING PARTS can cause injury.

- Keep away from fans, belts, and rotors.
- Keep all doors, panels, covers, and guards closed and securely in place.
- Stop engine before installing or connecting unit.
- Have only qualified people remove guards or covers for maintenance and troubleshooting as necessary.
- To prevent accidental starting during servicing, disconnect negative (-) battery cable from battery.
- Keep hands, hair, loose clothing, and tools away from moving parts.
- Reinstall panels or guards and close doors when servicing is finished and before starting engine.
- Before working on generator, remove spark plugs or injectors to keep engine from kicking back or starting.
- Block flywheel so that it will not turn while working on generator components.



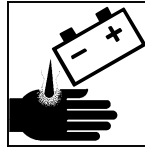
### STEAM AND HOT COOLANT can burn.

- If possible, check coolant level when engine is cold to avoid scalding.
- Always check coolant level at overflow tank, if present on unit, instead of radiator (unless told otherwise in maintenance section or engine manual).
- If the engine is warm, checking is needed, and there is no overflow tank, follow the next two statements.
- Wear safety glasses and gloves and put a rag over radiator cap.
- Turn cap slightly and let pressure escape slowly before completely removing cap.



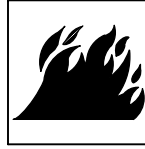
### ENGINE EXHAUST GASES can kill.

- Use equipment outside in open, well-ventilated areas.
- If used in a closed area, vent engine exhaust outside and away from any building air intakes.



### BATTERY ACID can BURN SKIN and EYES.

- Do not tip battery.
- Replace damaged battery.
- Flush eyes and skin immediately with water.



### ENGINE HEAT can cause fire.

- Do not locate unit on, over, or near combustible surfaces or flammables.
- Keep exhaust and exhaust pipes way from flammables.



### EXHAUST SPARKS can cause fire.

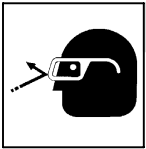
- Do not let engine exhaust sparks cause fire.
- Use approved engine exhaust spark arrestor in required areas — see applicable codes.

## 1-4. Compressed Air Hazards



### BREATHING COMPRESSED AIR can cause serious injury or death.

- Do not use compressed air for breathing.
- Use only for cutting, gouging, and tools.



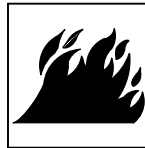
### COMPRESSED AIR can cause injury.

- Wear approved safety goggles.
- Do not direct air stream toward self or others.



### TRAPPED AIR PRESSURE AND WHIPPING HOSES can cause injury.

- Release air pressure from tools and system before servicing, adding or changing attachments, or opening compressor oil drain or oil fill cap.



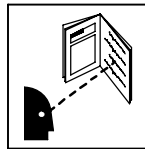
### HOT METAL from air arc cutting and gouging can cause fire or explosion.

- Do not cut or gouge near flammables.
- Watch for fire; keep extinguisher nearby.



### HOT PARTS can cause burns and injury.

- Do not touch hot compressor or air system parts.
- Let system cool down before touching or servicing.



### READ INSTRUCTIONS.

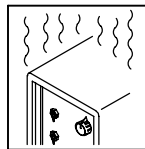
- Read Owner's Manual before using or servicing unit.
- Stop engine and release air pressure before servicing.

## 1-5. Additional Symbols For Installation, Operation, And Maintenance



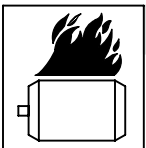
### FALLING UNIT can cause injury.

- Use lifting eye to lift unit only, NOT running gear, gas cylinders, trailer, or any other accessories.
- Use equipment of adequate capacity to lift and support unit.
- If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.



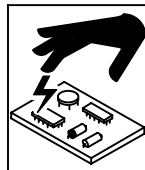
### OVERUSE can cause OVERHEATING.

- Allow cooling period; follow rated duty cycle.
- Reduce current or reduce duty cycle before starting to weld again.
- Do not block or filter airflow to unit.



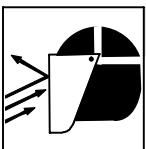
### OVERHEATING can damage motors.

- Turn off or unplug equipment before starting or stopping engine.
- Do not let low voltage and frequency caused by low engine speed damage electric motors.
- Do not connect 50 or 60 Hertz motors to the 100 Hertz receptacle where applicable.



### STATIC (ESD) can damage PC boards.

- Put on grounded wrist strap BEFORE handling boards or parts.
- Use proper static-proof bags and boxes to store, move, or ship PC boards.



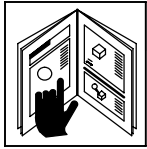
### FLYING SPARKS can cause injury.

- Wear a face shield to protect eyes and face.
- Shape tungsten electrode only on grinder with proper guards in a safe location wearing proper face, hand, and body protection.
- Sparks can cause fires — keep flammables away.



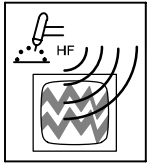
### TILTING OF TRAILER can cause injury.

- Use tongue jack or blocks to support weight.
- Properly install welding generator onto trailer according to instructions supplied with trailer.



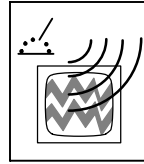
## READ INSTRUCTIONS.

- Use only genuine MILLER/Hobart replacement parts.
- Perform engine and air compressor (if applicable) maintenance and service according to this manual and the engine/air compressor (if applicable) manuals.



## H.F. RADIATION can cause interference.

- High-frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
- Have only qualified persons familiar with electronic equipment perform this installation.
- The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
- If notified by the FCC about interference, stop using the equipment at once.
- Have the installation regularly checked and maintained.
- Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.



## ARC WELDING can cause interference.

- Electromagnetic energy can interfere with sensitive electronic equipment such as microprocessors, computers, and computer-driven equipment such as robots.
- Be sure all equipment in the welding area is electromagnetically compatible.
- To reduce possible interference, keep weld cables as short as possible, close together, and down low, such as on the floor.
- Locate welding operation 100 meters from any sensitive electronic equipment.
- Be sure this welding machine is installed and grounded according to this manual.
- If interference still occurs, the user must take extra measures such as moving the welding machine, using shielded cables, using line filters, or shielding the work area.

## 1-6. California Proposition 65 Warnings

- ▲ **Welding or cutting equipment produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)**
- ▲ **Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.**

### For Gasoline Engines:

- ▲ **Engine exhaust contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.**

### For Diesel Engines:

- ▲ **Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.**

## 1-7. Principal Safety Standards

*Safety in Welding, Cutting, and Allied Processes*, ANSI Standard Z49.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami FL 33126 (phone: 305-443-9353, website: [www.aws.org](http://www.aws.org)).

*Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping*, American Welding Society Standard AWS F4.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126 (phone: 305-443-9353, website: [www.aws.org](http://www.aws.org)).

*National Electrical Code*, NFPA Standard 70, from National Fire Protection Association, P.O. Box 9101, 1 Battery March Park, Quincy, MA 02269-9101 (phone: 617-770-3000, website: [www.nfpa.org](http://www.nfpa.org) and [www.sparky.org](http://www.sparky.org)).

*Safe Handling of Compressed Gases in Cylinders*, CGA Pamphlet P-1, from Compressed Gas Association, 1735 Jefferson Davis Highway, Suite 1004, Arlington, VA 22202-4102 (phone: 703-412-0900, website: [www.cganet.com](http://www.cganet.com)).

*Code for Safety in Welding and Cutting*, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Bou-

levard, Rexdale, Ontario, Canada M9W 1R3 (phone: 800-463-6727 or in Toronto 416-747-4044, website: [www.csa-international.org](http://www.csa-international.org)).

*Practice For Occupational And Educational Eye And Face Protection*, ANSI Standard Z87.1, from American National Standards Institute, 11 West 42nd Street, New York, NY 10036-8002 (phone: 212-642-4900, website: [www.ansi.org](http://www.ansi.org)).

*Standard for Fire Prevention During Welding, Cutting, and Other Hot Work*, NFPA Standard 51B, from National Fire Protection Association, P.O. Box 9101, 1 Battery March Park, Quincy, MA 02269-9101 (phone: 617-770-3000, website: [www.nfpa.org](http://www.nfpa.org) and [www.sparky.org](http://www.sparky.org)).

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910, Subpart Q, and Part 1926, Subpart J, from U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250 (there are 10 Regional Offices—phone for Region 5, Chicago, is 312-353-2220, website: [www.osha.gov](http://www.osha.gov)).

## 1-8. EMF Information

Considerations About Welding And The Effects Of Low Frequency Electric And Magnetic Fields

Welding current, as it flows through welding cables, will cause electromagnetic fields. There has been and still is some concern about such fields. However, after examining more than 500 studies spanning 17 years of research, a special blue ribbon committee of the National Research Council concluded that: "The body of evidence, in the committee's judgment, has not demonstrated that exposure to power-frequency electric and magnetic fields is a human-health hazard." However, studies are still going forth and evidence continues to be examined. Until the final conclusions of the research are reached, you may wish to minimize your exposure to electromagnetic fields when welding or cutting.

To reduce magnetic fields in the workplace, use the following procedures:











1. Keep cables close together by twisting or taping them.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.
4. Keep welding power source and cables as far away from operator as practical.
5. Connect work clamp to workpiece as close to the weld as possible.

### About Pacemakers:

Pacemaker wearers consult your doctor first. If cleared by your doctor, then following the above procedures is recommended.

# SECTION 2 – DEFINITIONS

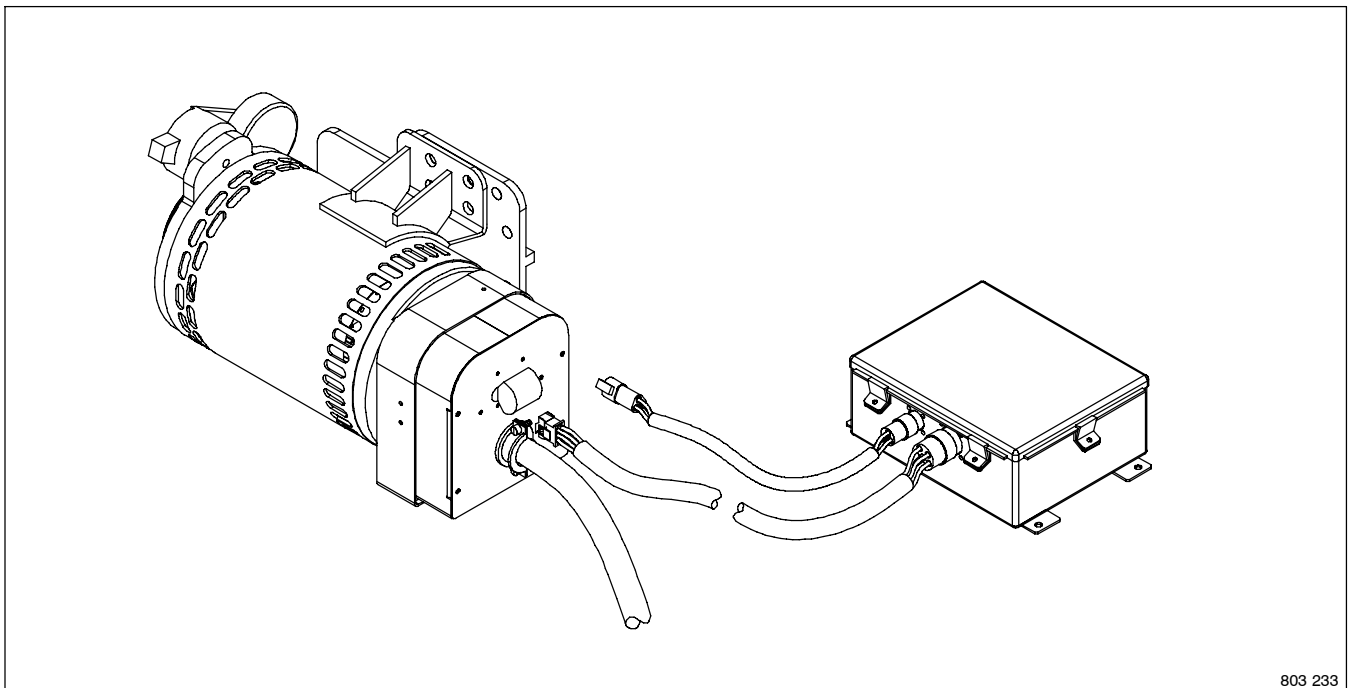
## 2-1. Symbol Definitions

	Circuit Breaker		Read Operator's Manual	<b>A</b>	Amperes	<b>V</b>	Volts
<b>+</b>	Positive	<b>—</b>	Negative		Alternating Current (AC)		Output
	Time	<b>h</b>	Hours		Temperature		Protective Earth (Ground)
			Welding Arc (Electrode)		Work Connection		Voltage Input

# SECTION 3 – SPECIFICATIONS

## 3-1. Description

This belt or hydraulically-driven generator supplies ac power to the platform to run tools through an ac receptacle, and also operate lights, and cutting and welding equipment. All power regulation components are located in a water-tight box that is connected by cable to the generator. The generator supplies power when running at the specified speed with the Power switch on (switch is located on platform). A 3-pole, 30 Amp circuit breaker protects the generator from overload.

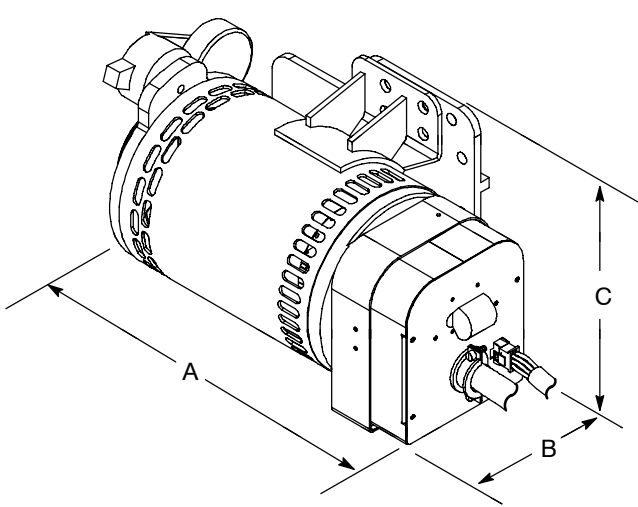


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## 3-2. Specifications

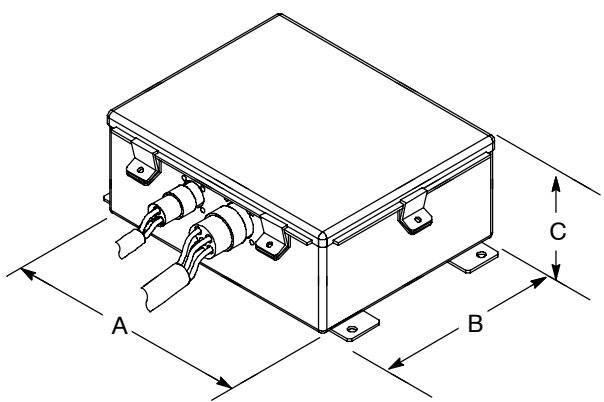
Drive-Type	Output	Generator Speed
Belt-Drive/Pulley	Single-Phase, 6 kVA/kW, 25 A, 120/240 V, 50/60 Hz 1.0 Power Factor 100% Duty Cycle	3000 rpm (50 Hz) 3600 rpm (60 Hz)
Hydraulic	Three-Phase 7.5 kVA/kW, 18 A, 240 V, 50/60 Hz, 1.0 Power Factor 100% Duty Cycle	

### 3-3. Generator Dimensions And Weight

<b>Dimensions</b>		
A	20-1/2 in (521 mm)	
B	9 in (229 mm)	
C	13 in (330 mm)	
<b>Weight</b>		
110 lb (50 kg)		<small>803 233</small>

*A belt-driven model is shown.*

### 3-4. Controller Dimensions And Weight

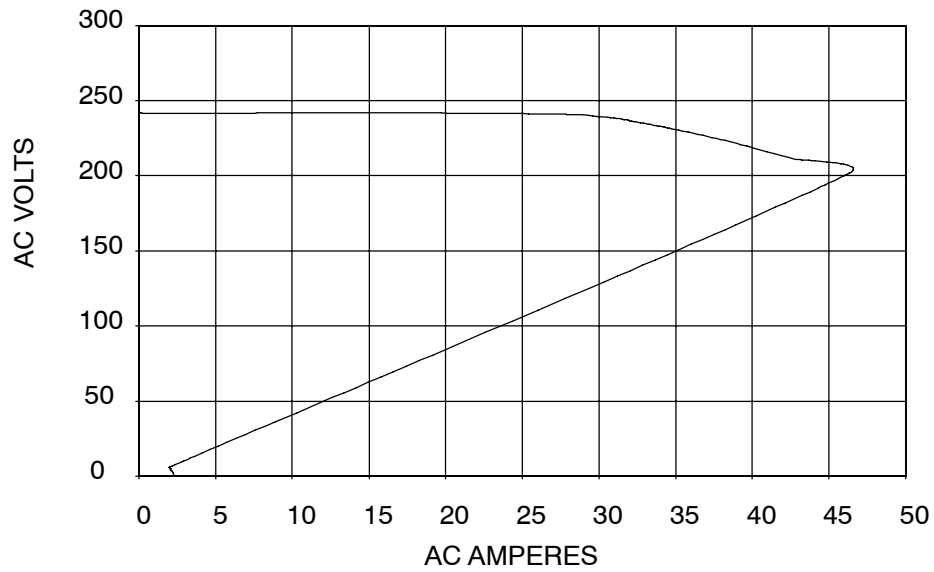
<b>Dimensions</b>		
A	11-1/2 in (292 mm)	
B	9-1/2 in (241 mm)	
C	4-1/2 in (114 mm)	
<b>Weight</b>		
10 lb (5 kg)		<small>803 233</small>



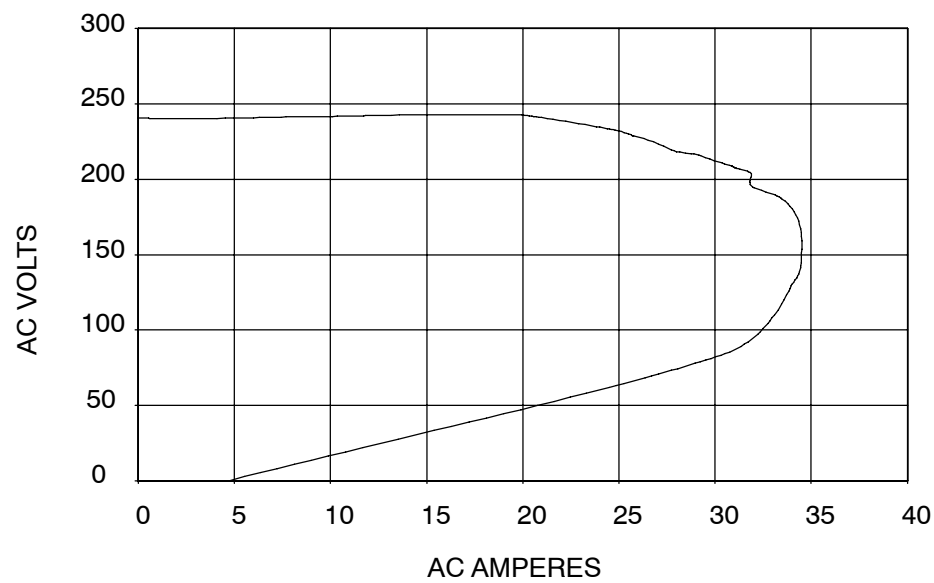
### 3-5. AC Power Curve

The ac power curve shows the power in amperes available from the generator.

#### A. 6 kVA/Kw Single-Phase Output



#### B. 7.5 kVA/kW Three-Phase Output



# SECTION 4 – MAINTENANCE AND TROUBLESHOOTING

## 4-1. Maintenance Schedule

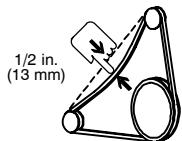


▲ **Stop engine before maintaining.**

☞ *Service more often if used in severe conditions.*

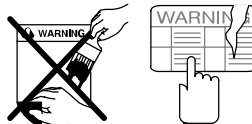
\* To be done by Factory Authorized Service Agent.

🕒 **Every 250 h**



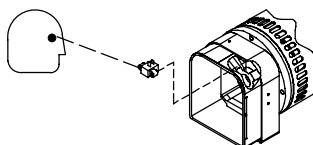
1/2 in.  
(13 mm)

Check Belt  
Tension  
(Belt-Driven  
Models Only)

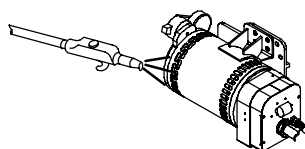


Replace  
Unreadable  
Labels.

🕒 **Every 500 h**



Service Welding Generator  
Brushes And Slip Rings. Service  
More Often In Dirty Conditions.\*



Blow Out Inside Of  
Generator.  
During Heavy Service,  
Clean Monthly.

## 4-2. Overload Protection



▲ **Stop engine.**

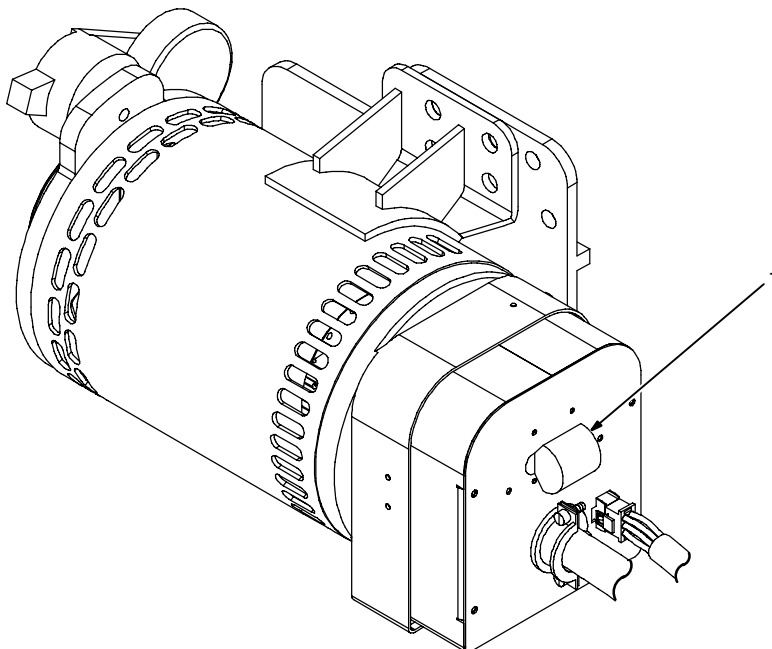
☞ *When a circuit breaker opens, it usually indicates a more serious problem exists. Contact Factory Authorized Service Agent.*

Open cover to access generator.

1 Circuit Breaker CB1

CB1 protects the generator windings from overload. If CB1 opens, generator output stops.

Close covers before operating unit.



## 4-3. Troubleshooting



Trouble	Remedy
No generator output at platform receptacles.	Be sure generator control switch is turned on at platform.
	Check and secure electrical connections at platform, generator, and control box.
	Be sure all equipment is turned off when starting unit.
	Reset circuit breaker CB1 (see Section 4-2).
	Check connections at receptacle RC3.
	Be sure +12 volts dc input voltage is being supplied to control box.
Low generator output at platform receptacles.	Verify generator is running at 3600 rpm.
	Have Factory Authorized Service Agent check brushes, slip rings, and circuit boards PC1 and PC2.
High generator output at platform receptacles.	Check control settings on welding equipment.
	Verify generator is running at 3600 rpm.
	Have Factory Authorized Service Agent check brushes, slip rings, and circuit boards PC1 and PC2.
Erratic generator output at platform receptacles.	Check and secure electrical connections at platform, generator, and control box.
	Verify generator is running at 3600 rpm.
	Have Factory Authorized Service Agent check brushes, slip rings, and circuit boards PC1 and PC2.

# Notes

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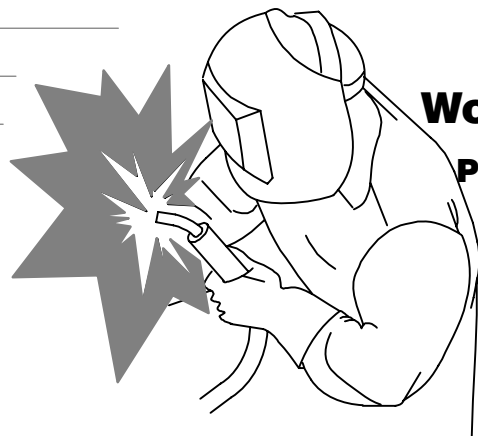
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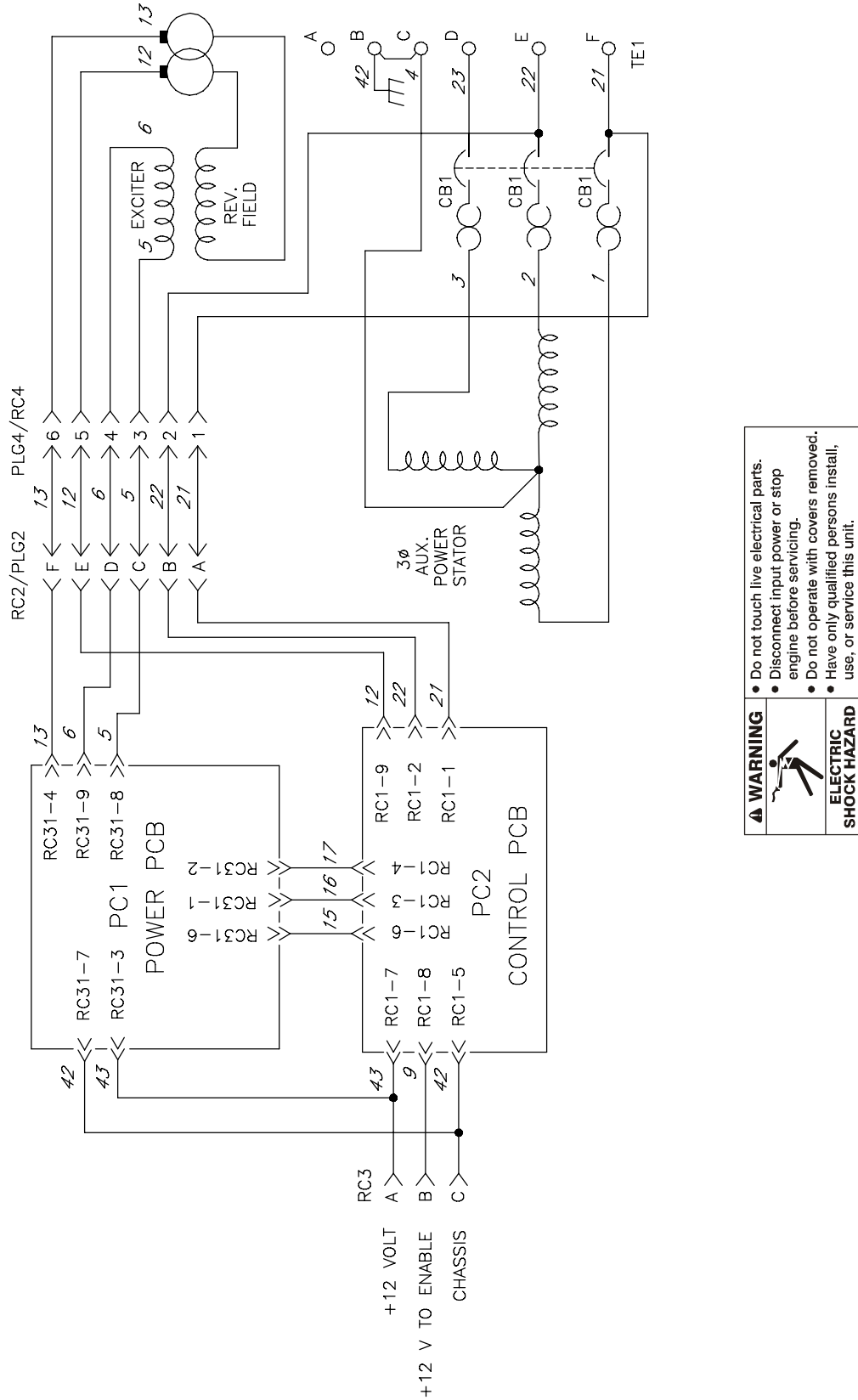
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**Work like a Pro!**  
**Pros weld and cut safely. Read the safety rules at the beginning of this manual.**

# SECTION 5 - ELECTRICAL DIAGRAM



**⚠ WARNING**  
 Do not touch live electrical parts.  
 Disconnect input power or stop engine before servicing.  
 Do not operate with covers removed.  
 Have only qualified persons install, use, or service this unit.

**ELECTRIC SHOCK HAZARD**

Figure 5-1. Circuit Diagram For Generator And Controller

# SECTION 6 – GENERATOR POWER GUIDELINES

## 6-1. Selecting Equipment

- 1 Generator Power Receptacles – Neutral Bonded To Frame
- 2 3-Prong Plug From Case Grounded Equipment
- 3 2-Prong Plug From Double Insulated Equipment

▲ Do not use 2-prong plug unless equipment is double insulated.

Be sure equipment has this symbol and/or wording.

gen\_pwr 11/02\* – Ref. ST-159 730 / ST-800 577

## 6-2. How Much Power Does Equipment Require?

- 1 Resistive Load  
A light bulb is a resistive load and requires a constant amount of power.
- 2 Non-Resistive Load  
Equipment with a motor is a non-resistive load and requires approximately six times more power while starting the motor than when running (see Section 6-6).
- 3 Rating Data  
Rating shows volts and amperes, or watts required to run equipment.

**AMPERES x VOLTS = WATTS**

**EXAMPLE 1:** If a drill uses 4.5 amperes at 115 volts, calculate its running power requirement in watts.

$$4.5 \text{ A} \times 115 \text{ V} = 520 \text{ W}$$

The load applied by the drill is 520 watts.

**EXAMPLE 2:** If three 200 watt flood lamps are used with the drill from Example 1, add the individual loads to calculate total load.

$$(200 \text{ W} + 200 \text{ W} + 200 \text{ W}) + 520 \text{ W} = 1120 \text{ W}$$

The total load applied by the three flood lamps and drill is 1120 watts.

S-0623

### 6-3. Approximate Power Requirements For Industrial Motors

Industrial Motors	Rating	Starting Watts	Running Watts
Split Phase	1/8 HP	800	300
	1/6 HP	1225	500
	1/4 HP	1600	600
	1/3 HP	2100	700
	1/2 HP	3175	875
Capacitor Start-Induction Run	1/3 HP	2020	720
	1/2 HP	3075	975
	3/4 HP	4500	1400
	1 HP	6100	1600
	1-1/2 HP	8200	2200
	2 HP	10550	2850
	3 HP	15900	3900
Capacitor Start-Capacitor Run	5 HP	23300	6800
	1-1/2 HP	8100	2000
	5 HP	23300	6000
	7-1/2 HP	35000	8000
Fan Duty	10 HP	46700	10700
	1/8 HP	1000	400
	1/6 HP	1400	550
	1/4 HP	1850	650
	1/3 HP	2400	800
	1/2 HP	3500	1100

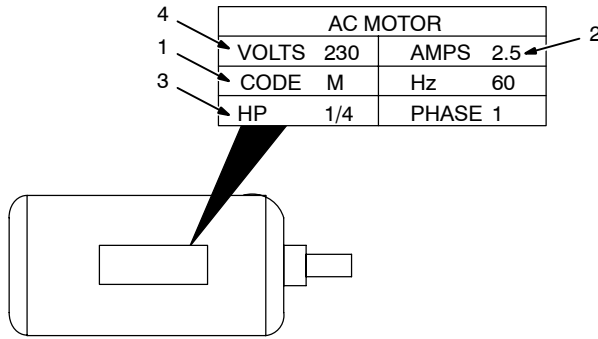
### 6-4. Approximate Power Requirements For Farm/Home Equipment

Farm/Home Equipment	Rating	Starting Watts	Running Watts
Stock Tank De-Icer		1000	1000
Grain Cleaner	1/4 HP	1650	650
Portable Conveyor	1/2 HP	3400	1000
Grain Elevator	3/4 HP	4400	1400
Milk Cooler		2900	1100
Milker (Vacuum Pump)	2 HP	10500	2800
FARM DUTY MOTORS	1/3 HP	1720	720
Std. (e.g. Conveyors,	1/2 HP	2575	975
Feed Augers, Air	3/4 HP	4500	1400
Compressors)	1 HP	6100	1600
	1-1/2 HP	8200	2200
	2 HP	10550	2850
	3 HP	15900	3900
	5 HP	23300	6800
High Torque (e.g. Barn	1-1/2 HP	8100	2000
Cleaners, Silo Unloaders,	5 HP	23300	6000
Silo Hoists, Bunk Feeders)	7-1/2 HP	35000	8000
	10 HP	46700	10700
3-1/2 cu. ft. Mixer	1/2 HP	3300	1000
High Pressure 1.8 Gal/Min	500 PSI	3150	950
Washer 2 gal/min	550 PSI	4500	1400
2 gal/min	700 PSI	6100	1600
Refrigerator or Freezer		3100	800
Shallow Well Pump	1/3 HP	2150	750
	1/2 HP	3100	1000
Sump Pump	1/3 HP	2100	800
	1/2 HP	3200	1050

## 6-5. Approximate Power Requirements For Contractor Equipment

Contractor	Rating	Starting Watts	Running Watts
Hand Drill	1/4 in	350	350
	3/8 in	400	400
	1/2 in	600	600
Circular Saw	6-1/2 in	500	500
	7-1/4 in	900	900
	8-1/4 in	1400	1400
Table Saw	9 in	4500	1500
	10 in	6300	1800
Band Saw	14 in	2500	1100
Bench Grinder	6 in	1720	720
	8 in	3900	1400
	10 in	5200	1600
Air Compressor	1/2 HP	3000	1000
	1 HP	6000	1500
	1-1/2 HP	8200	2200
	2 HP	10500	2800
Electric Chain Saw	1-1/2 HP, 12 in	1100	1100
	2 HP, 14 in	1100	1100
Electric Trimmer	Standard 9 in	350	350
	Heavy Duty 12 in	500	500
Electric Cultivator	1/3 HP	2100	700
Elec. Hedge Trimmer	18 in	400	400
Flood Lights	HID	125	100
	Metal Halide	313	250
	Mercury	1000	
	Sodium Vapor	1400	1000
Submersible Pump	400 gph	600	200
Centrifugal Pump	900 gph	900	500
Floor Polisher	3/4 HP, 16 in	4500	1400
	1 HP, 20 in	6100	1600
High Pressure Washer	1/2 HP	3150	950
	3/4 HP	4500	1400
	1 HP	6100	1600
55 gal Drum Mixer	1/4 HP	1900	700
Wet & Dry Vac	1.7 HP	900	900
	2-1/2 HP	1300	1300

## 6-6. Power Required To Start Motor



- 1 Motor Start Code
- 2 Running Amperage
- 3 Motor HP
- 4 Motor Voltage

To find starting amperage:

**Step 1:** Find code and use table to find kVA/HP. If code is not listed, multiply running amperage by six to find starting amperage.

**Step 2:** Find Motor HP and Volts.

**Step 3:** Determine starting amperage (see example).

Welding generator amperage output must be at least twice the motor's running amperage.

**Single-Phase Induction Motor Starting Requirements**

Motor Start Code	G	H	J	K	L	M	N	P
KVA/HP	6.3	7.1	8.0	9.0	10.0	11.2	12.5	14.0

$$\frac{\text{kVA/HP} \times \text{HP} \times 1000}{\text{VOLTS}} = \text{STARTING AMPERAGE}$$

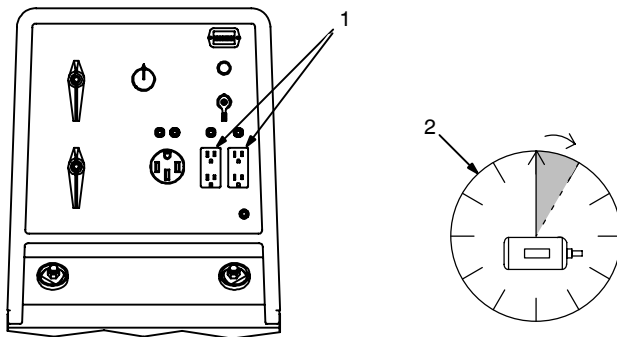
**EXAMPLE:** Calculate the starting amperage required for a 230 V, 1/4 HP motor with a motor start code of M.

Volts = 230    HP = 1/4    Using Table, Code M results in kVA/HP = 11.2

$$\frac{11.2 \times 1/4 \times 1000}{230} = 12.2 \text{ A} \quad \text{Starting the motor requires 12.2 amperes.}$$

S-0624

## 6-7. How Much Power Can Generator Supply?



- 1 Limit Load To 90% Of Generator Output

Always start non-resistive (motor) loads in order from largest to smallest, and add resistive loads last.

- 2 5 Second Rule

If motor does not start within 5 seconds, turn off power to prevent motor damage. Motor requires more power than generator can supply.

Ref. ST-800 396-A / S-0625



## 6-8. Selecting Extension Cord (Use Shortest Cord Possible)



### Cord Lengths for 120 Volt Loads

▲ If unit does not have GFCI receptacles, use GFCI-protected extension cord.

Current (Amperes)	Load (Watts)	Maximum Allowable Cord Length in ft (m) for Conductor Size (AWG)*					
		4	6	8	10	12	14
5	600			350 (106)	225 (68)	137 (42)	100 (30)
7	840		400 (122)	250 (76)	150 (46)	100 (30)	62 (19)
10	1200	400 (122)	275 (84)	175 (53)	112 (34)	62 (19)	50 (15)
15	1800	300 (91)	175 (53)	112 (34)	75 (23)	37 (11)	30 (9)
20	2400	225 (68)	137 (42)	87 (26)	50 (15)	30 (9)	
25	3000	175 (53)	112 (34)	62 (19)	37 (11)		
30	3600	150 (46)	87 (26)	50 (15)	37 (11)		
35	4200	125 (38)	75 (23)	50 (15)			
40	4800	112 (34)	62 (19)	37 (11)			
45	5400	100 (30)	62 (19)				
50	6000	87 (26)	50 (15)				

\*Conductor size is based on maximum 2% voltage drop

### Cord Lengths for 240 Volt Loads

▲ If unit does not have GFCI receptacles, use GFCI-protected extension cord.

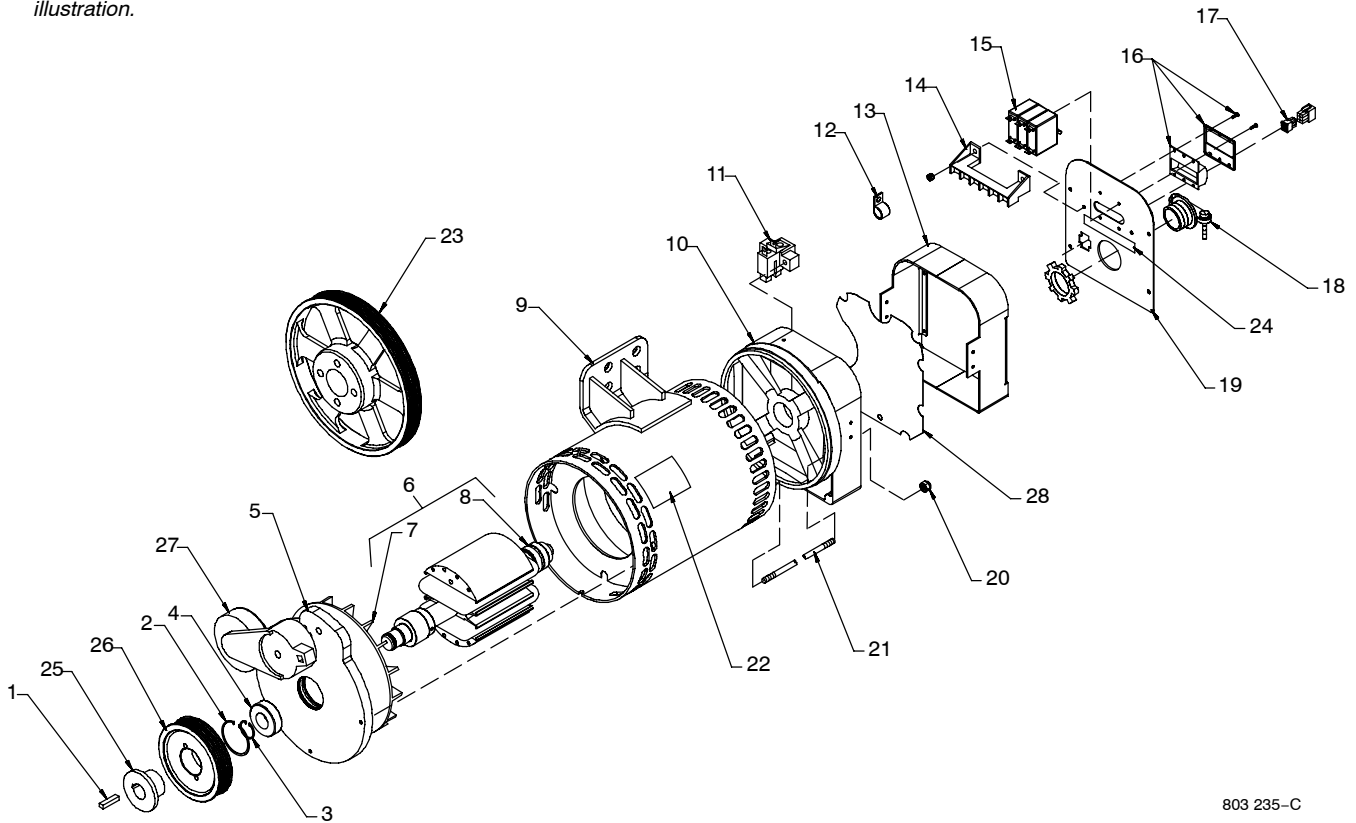
Current (Amperes)	Load (Watts)	Maximum Allowable Cord Length in ft (m) for Conductor Size (AWG)*					
		4	6	8	10	12	14
5	1200			700 (213)	450 (137)	225 (84)	200 (61)
7	1680		800 (244)	500 (152)	300 (91)	200 (61)	125 (38)
10	2400	800 (244)	550 (168)	350 (107)	225 (69)	125 (38)	100 (31)
15	3600	600 (183)	350 (107)	225 (69)	150 (46)	75 (23)	60 (18)
20	4800	450 (137)	275 (84)	175 (53)	100 (31)	60 (18)	
25	6000	350 (107)	225 (69)	125 (38)	75 (23)		
30	7000	300 (91)	175 (53)	100 (31)	75 (23)		
35	8400	250 (76)	150 (46)	100 (31)			
40	9600	225 (69)	125 (38)	75 (23)			
45	10,800	200 (61)	125 (38)				
50	12,000	175 (53)	100 (31)				

\*Conductor size is based on maximum 2% voltage drop

# SECTION 7 – PARTS LIST

Hardware is common and not available unless listed.

Actual parts may vary from illustration.



803 235-C

Figure 7-1. Generator Assembly

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
----------	------------	----------	-------------	----------

Figure 7-1. Generator Assembly

.....	..	Generator Assy, <b>Belt-Drive, Cat (Mitsubishi)</b> (includes)	1
.....	..	Generator Assy, <b>Belt-Drive, Deutz, Ford, Cat (Perkins)</b> (includes)	1
.....	..	Generator Assy, <b>Hydraulic-Drive</b> (includes)	1
.....	..	Generator Assy, <b>Belt-Drive, Cat (Turbo)</b> (includes)	1
... 1	.....	Key, Stl .250 X .250 X 1.750 (Belt-Drive Only)	1
... 2	.....	Ring, Rtnng Int 2.000 Groove Dia X .064 Thk	1
... 3	.....	Ring, Rtnng Ext 1.000 Shaft X .042 Thk	1
... 4	.....	Bearing, Ball Rdl Sgl Row .984 X 2.047 X .591	1
... 5	.....	Endbell, Gen <b>Belt-Drive</b>	1
... 5	.....	Endbell, Gen <b>Belt-Drive, Cat (Turbo)</b>	1
... 5	.....	Endbell, Gen <b>Hydraulic-Drive Only</b>	1
... 6	.....	Rotor, Generator (includes)	1
... 7	.....	Fan, Rotor Gen	1
... 8	.....	Bearing, Ball Radial	1
... 9	.....	+Stator, Generator <b>Belt-Drive, Cat (Mitsubishi)</b>	1
... 9	.....	+Stator, Generator <b>Belt-Drive Deutz, Ford, Cat (Perkins)</b>	1
... 9	.....	+Stator, Generator <b>Hydraulic-Drive</b>	1

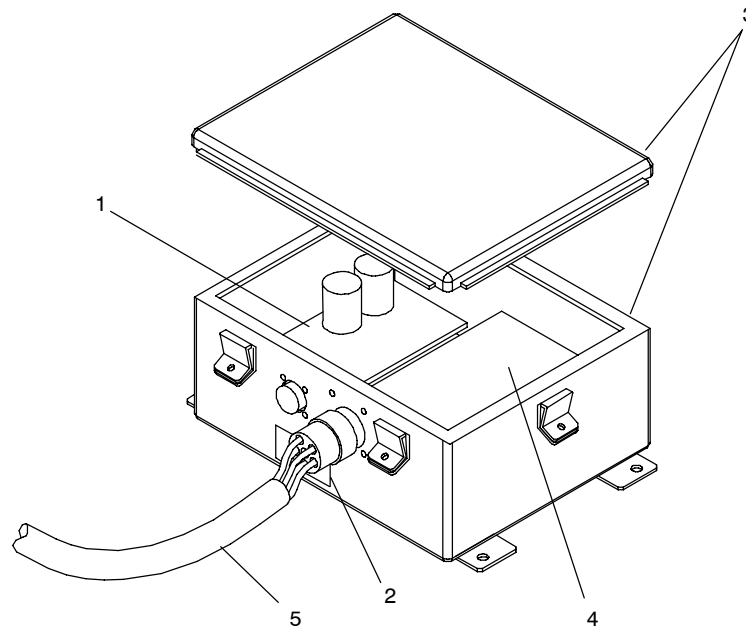
Item No.	Dia. Mkgs.	Part No.	Description	Quantity
<b>Figure 7-1. Generator Assembly (Continued)</b>				
... 9			+Stator, Generator <b>Belt-Drive, Cat (Turbo)</b>	1
... 10			Endbell, Gen Brush Block	1
... 11			Brushholder Assy, Generator	1
... 12			Clamp, Nyl .750 Clamp Dia X.500 Wide .203 Mtg Hole <b>Belt/Hydraulic-Drive Deutz, Ford, Cat (Perkins) (Turbo)</b>	1
... 13			Shroud Assy, Endbell <b>Belt/Hydraulic-Drive Deutz, Ford, Cat (Perkins) (Turbo)</b>	1
... 13			Shroud Assy, Endbell <b>Belt-Drive Cat (Mitsubishi)</b>	1
... 14	TE1		Block, Stud Connection 6 Position	1
... 15	CB1		Circuit Breaker, Man Reset 3p 30a 250vac	1
... 16			Boot, Circuit Breaker 3 Pole W/Bezel And Hardware	1
... 17			Connector, W/Leads (includes)	1
... RC4			Conn, Rect Univ 084 6p/S 3row Rcpt Cable/Panel Lkg	1
... 18			Conn, Clamp Cable 1.250	1
... 19			Panel, End Shroud	1
... 19			Panel, End Shroud <b>Belt-Drive Cat (Mitsubishi)</b>	1
... 20			Nut, 250-20 .50hex .39h Stl Pld Elastic Stop Nut	4
... 21			Stud, Stl .250-20 X 12.875	4
... 22			Label, Warning Moving Parts Can Cause Serious Injury	1
... 23			Pulley, Drive 1.694 In Bore, 4 Bolt Pat <b>(Belt-Drive Only) Deutz</b>	1
... 23			Pulley, Drive 1.688 In Bore, 3 Bolt Pat <b>(Belt-Drive Only) Cat/Perkins</b>	1
... 23			Pulley, Drive 1.688 In Bore, 4 Bolt Pat <b>(Belt-Drive Only) Mitsubishi, Turbo</b>	1
... 24			Label, Label,Term Mkg Connections	1
... 25			*Bushing, Stl .938 Id X 1.625 Od X 1.000 Lg (Belt-Drive Only)	1
... 26			*Pulley, Generator 4.88 Dia <b>(60 Hz Belt-Drive Only) Deutz, Mitsubishi, Turbo</b>	1
... 26			*Pulley, Generator 5.63 Dia <b>(50 Hz Belt-Drive Only) Deutz</b>	1
... 26			*Pulley, Generator 3.00 Pitch Dia <b>(50 Hz Belt-Drive Only) Ford</b>	1
... 27			*Tensioner, Belt W/Pully <b>(Belt-Drive Only)</b>	1
... 28			Protector, Lead Mylar	1

\* Not included in generator assembly.

+ When ordering a component originally displaying a precautionary label, the label should also be ordered. Order label individually or as part of Label Kit.

**To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.**

☞ Hardware is common and not available unless listed.



Ref. 803 236

**Figure 7-2. Controller Assembly**

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
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**Figure 7-2. Controller Assembly**

.....		..	Control Box, Assy 60 Hz (includes) .....	1
.....		..	Control Box, Assy 50 Hz (includes) .....	1
... 1	PC1	...	Circuit Card Assy, Gen Power .....	1
... 2		.....	Label, 60 Hz .....	1
.....		.....	Label, 50 Hz .....	1
... 3		.....	Control Box, Belt/Hydraulic-Driven Generator .....	1
.....		.....	Stand-off Support, PC Card .312/.375w/Post&lock .43 .....	8
... 4	PC2	.....	Circuit Card Assy, Control .....	1
.....		.....	Panel, Mtg PC Card .....	1
.....		.....	Harness, Wrg Control Box (Not Shown) (includes) .....	1
..... RC1, RC14		.....	Conn, Rect Univ 084 9p/S 3row Plug Cable Lkg .....	2
..... RC2		.....	Conn, Circ 6 Skt Rcpt Pushin Panel .....	1
..... RC3		.....	Conn, Circ 3 Skt Rcpt Pushin Panel .....	1
.....		.....	Conn, Push 4 Wire 12-16strnd 12-18sld 16-22tinstrnd .....	2
.....		.....	Gasket, Connector .....	1
.....		.....	Gasket (Seal), Connector .....	1
... 5		..	Harness, Wrg Inter Gen/Control ( <b>Belt-Drive Only</b> ) (includes) .....	1
..... PLG4		.....	Conn, Rect Univ 084 6p/S 3row Plug Cable Lkg .....	1
.....		.....	Seal, Wire Univ 6p/S 3row .....	1
..... PLG2		.....	Conn, Circ 6 Skt Plug Pushin Cable .....	1
.....		.....	Seal, Interface Univ 6p/3Row .....	1
... 5		..	Harness, Wrg Inter Gen/Control ( <b>Hydraulic-Drive Only</b> ) (includes) .....	1
..... PLG4		.....	Conn, Rect Univ 084 6p/S 3row Plug Cable Lkg .....	1
.....		.....	Seal, Wire Univ 6p/S 3row .....	1
..... PLG2		.....	Conn, Circ 6 Skt Plug Pushin Cable .....	1
.....		.....	Seal, Interface Univ 6p/3Row .....	1

+ When ordering a component originally displaying a precautionary label, the label should also be ordered. Order label individually or as part of Label Kit.

**To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.**

# Notes

## DECIMAL EQUIVALENTS

	$\frac{1}{64}$	.015625
	$\frac{1}{32}$	.03125
	$\frac{3}{64}$	.046875
$\frac{1}{16}$	$\frac{5}{64}$	.0625
	$\frac{7}{64}$	.078125
	$\frac{9}{32}$	.09375
$\frac{1}{8}$	$\frac{11}{64}$	.109375
	$\frac{13}{64}$	.125
	$\frac{15}{32}$	.140625
	$\frac{17}{64}$	.15625
$\frac{3}{16}$	$\frac{19}{64}$	.171875
	$\frac{21}{64}$	.1875
	$\frac{23}{32}$	.203125
	$\frac{25}{64}$	.21875
$\frac{1}{4}$	$\frac{27}{64}$	.234375
	$\frac{29}{64}$	.25
	$\frac{31}{32}$	.265625
	$\frac{33}{64}$	.28125
$\frac{5}{16}$	$\frac{35}{64}$	.296875
	$\frac{37}{64}$	.3125
	$\frac{39}{32}$	.328125
	$\frac{41}{64}$	.34375
$\frac{3}{8}$	$\frac{43}{64}$	.359375
	$\frac{45}{64}$	.375
	$\frac{47}{32}$	.390625
	$\frac{49}{64}$	.40625
$\frac{7}{16}$	$\frac{51}{64}$	.421875
	$\frac{53}{64}$	.4375
	$\frac{55}{32}$	.453125
	$\frac{57}{64}$	.46875
$\frac{1}{2}$	$\frac{59}{64}$	.484375
	$\frac{61}{64}$	.5
	$\frac{63}{32}$	.515625
	$\frac{65}{64}$	.53125
$\frac{9}{16}$	$\frac{67}{64}$	.546875
	$\frac{69}{64}$	.5625
	$\frac{71}{32}$	.578125
	$\frac{73}{64}$	.59375
$\frac{5}{8}$	$\frac{75}{64}$	.609375
	$\frac{77}{64}$	.625
	$\frac{79}{32}$	.640625
	$\frac{81}{64}$	.65625
$\frac{11}{16}$	$\frac{83}{64}$	.671875
	$\frac{85}{64}$	.6875
	$\frac{87}{32}$	.703125
	$\frac{89}{64}$	.71875
$\frac{3}{4}$	$\frac{91}{64}$	.734375
	$\frac{93}{64}$	.75
	$\frac{95}{32}$	.765625
	$\frac{97}{64}$	.78125
$\frac{13}{16}$	$\frac{99}{64}$	.796875
	$\frac{101}{64}$	.8125
	$\frac{103}{32}$	.828125
	$\frac{105}{64}$	.84375
$\frac{7}{8}$	$\frac{107}{64}$	.859375
	$\frac{109}{64}$	.875
	$\frac{111}{32}$	.890625
	$\frac{113}{64}$	.90625
$\frac{15}{16}$	$\frac{115}{64}$	.921875
	$\frac{117}{64}$	.9375
	$\frac{119}{32}$	.953125
	$\frac{121}{64}$	.96875
$\frac{1}{1}$	$\frac{123}{64}$	.984375
	$\frac{125}{64}$	1.







# Owner's Record

Please complete and retain with your personal records.

Model Name

Serial/Style Number

Purchase Date

(Date which equipment was delivered to original customer.)

Distributor

Address

City

State

Zip



## For Generator Service

**Call 1-877-554-5438 to contact JLG Service.**

Always provide Model Name and Serial/Style Number.

Contact your Miller Distributor for:

**Miller Electric Mfg. Co.**

An Illinois Tool Works Company  
1635 West Spencer Street  
Appleton, WI 54914 USA

**International Headquarters-USA**

USA Phone: 920-735-4505 Auto-Attended  
USA & Canada FAX: 920-735-4134  
International FAX: 920-735-4125

**European Headquarters -  
United Kingdom**

Phone: 44 (0) 1204-593493  
FAX: 44 (0) 1204-598066

[www.MillerWelds.com](http://www.MillerWelds.com)

Welding Supplies and Consumables

Options and Accessories

Personal Safety Equipment

Service and Repair

Replacement Parts

Training (Schools, Videos, Books)

Technical Manuals (Servicing Information  
and Parts)

Circuit Diagrams

Welding Process Handbooks

Contact the Delivering Carrier to:

File a claim for loss or damage during  
shipment.

For assistance in filing or settling claims, contact  
your distributor and/or equipment manufacturer's  
Transportation Department.

